

## Low Vision Devices and Training

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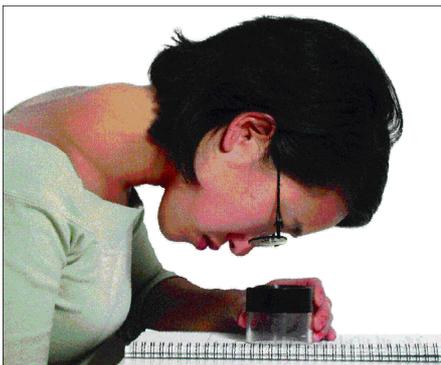
### Introduction

Vision is the ability to see with a clear perception of detail, colour and contrast, and to distinguish objects visually. Like any other sense, vision tends to deteriorate or diminish naturally with age. In most cases, reduction in visual capability can be corrected with glasses, medicine or surgery. However, if the visual changes occur because of an incurable eye disease, condition or injury, vision loss can be permanent. Many people around the world with permanent visual impairment have some residual vision which can be used with the help of low vision services, materials and devices.<sup>1</sup> This paper describes different options for the enhancement of residual vision including optical and non-optical devices and providing training for the low vision client.

### Low Vision Devices

There are several ways in which an image can be enlarged for a low vision client:

- **optical magnification** – magnifying the object by means of a lens or combination of lenses i.e. magnifiers and telescopes
- **relative size magnification** - increasing the size of the object, for example large print books or televisions with larger screen size
- **relative distance magnification** - reduc-



*Stand magnifier*

*Photo: Sarah Squire*

ing the distance of the object, for example, moving the reading material closer to the eye or going closer to the writing board.

### Optical Low Vision Devices

Optical devices consist of one or more lens placed between the eye and the object to be viewed, which increase the size of the image of the object on the retina. Low vision devices work on the principle of optical magnification and provide an enlarged image of the object.

#### • Magnifiers

Magnifiers can be prescribed as hand-held, hanging, stand, illuminated hand-held, illuminated stand, spectacles or bar and dome magnifiers. Spectacle magnifiers are the most commonly prescribed magnifiers. They come as full aperture, half-eye, or bifocal with base in prisms for binocular viewing.

#### • Telescopes

For people with low vision, telescopes with magnification powers from 2x to 10x are prescribed. These are prescribed for distance, intermediate and near tasks. Types of telescope include hand-held, clip-on, spectacle mounted and bioptic designs. Traditionally the power of low vision devices is denoted as x, which means the relative increase in the image size to the object size. For example a 2x would mean an increase in the image size by two times. As different manufacturers use different methods to calculate this, there is a growing trend to move away from this labelling and denote the powers of magnifiers in dioptres or as equivalent viewing distances (EVD).

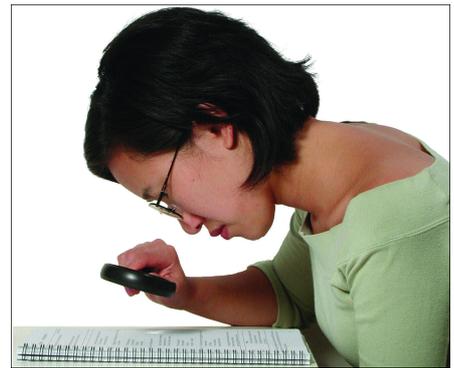
#### • Glare Control Devices

As glare may be a significant disabling factor in many eye conditions, tinted lenses are routinely prescribed along with 'caps', 'hats' and visors. Absorptive filters are tinted lenses, which are used to counter glare. They come in different tints at various levels of absorption and different cut-off points for the visible spectrum of light.

For an accurate and appropriate final prescription, the low vision clinic should have a range of magnifiers, telescopes and absorptive filters.

### Non-Optical Low Vision Devices

Non-optical devices are items designed to promote independent living. They alter environmental perception through enhancing illumination, contrast and spatial rela-



*Hand-held magnifier*

*Photo: Sarah Squire*

tionships. A useful slogan to remember the key to non-optical devices is 'Bigger, Bolder, Brighter'. Devices may include illumination devices such as lamps and reading stands, check registers, writing guides, bold-lined paper, needle-threaders, magnifying mirrors, high contrast watches, and large print items such as books.

To provide advice on non-optical devices, there should be a range of options available for demonstrating and training the client in their use. This advice can be given by any appropriately trained eye care worker.

### Electronic Devices

For people with severe visual loss, electronic devices are an option. There are two types; optical devices which display the task in a magnified form from a television monitor, and non-optical electronic devices which are conversion systems that convert text into a speech system.

#### • Closed Circuit Television

Electronic optical devices make use of a zoom television camera to magnify materials onto a television screen. They are called closed circuit televisions (CCTVs). The advantage of a CCTV is in its greater amplitude of magnification of 3x to 100x, normal working distance and reversed polarity (e.g. white on black). The disadvantages are the cost and the bulk of the system that makes it quite immovable.

#### • Conversion Systems

Non-optical electronic devices include talking watches, talking calculators and speech and Braille conversion systems.

With further developments in electronics, more and more devices are becoming available for people with low vision. It is important to keep up-to-date with these developments so that the best options can be offered to clients with low vision.

## Training: Equipping Low Vision Clients with Skills and Confidence

Functional vision may be improved with training. Many people can learn to make better use of their low vision and can function efficiently with only small amounts of visual information. Objects and print can be recognised when they are blurred or when only parts of them can be seen. Visual functioning plays a very significant role in promoting independent living in people with low vision. Whether the disability is mild, moderate, severe or profound, if people with low vision are given proper training in visual skills, they more often than not show an improved performance in their day to day activities and move closer to leading an independent life.

Essentially, there are two types of training:

- **Effective use of residual vision** by teaching the client visual skills such as eccentric viewing, tracking, scanning and pursuit movements. There are many exercises and training programmes available for clients

- **Use of prescribed devices** especially telescopes and magnifiers.

The final advice and prescription need to conform to the client's needs, and should be culturally appropriate, affordable and accessible.

## How to Access Resources for Low Vision Devices

One of the major impediments to providing low vision services has been the high cost of low vision devices available on the market. The Low Vision Resource Centre of the Hong Kong Society for the Blind now supplies low vision devices and assessment materials at affordable cost to developing countries. The new Centre has catalysed development of low vision programmes in many countries and is likely to have an even greater impact in the future. The LVDs and the assessment materials and equipment listed in the Recommended Standard List (page 8) are available from the VISION 2020 Low Vision Resource Centre of the Hong Kong Society for the Blind. The catalogue is on [www.hksb.org.hk](http://www.hksb.org.hk)

## Reference

1. Asia Pacific Low Vision Workshop. Report of a Workshop. Hong Kong, 28-30 May, 2001. WHO/PBL02.87. Available online at [http://whqlibdoc.who.int/hq/2002/WHO\\_PBL\\_02.87.pdf](http://whqlibdoc.who.int/hq/2002/WHO_PBL_02.87.pdf)



## The Low Vision Resource Centre

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[www.hksb.org.hk](http://www.hksb.org.hk)  
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## Low Vision Courses

Information about Low Vision courses can be found in the publications section of the VISION 2020 website.  
[www.V2020.org](http://www.V2020.org)

## Abstract

### The development of the LV Prasad-Functional Vision Questionnaire: a measure of functional vision performance of visually impaired children

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**PURPOSE:** To develop a reliable and valid questionnaire (the LV Prasad-Functional Vision Questionnaire, LVP-FVQ) to assess self-reported functional vision problems of visually impaired school children. **METHODS:** The LVP-FVQ consisting of 19 items was administered verbally to 78 visually impaired Indian school children aged 8 to 18 years. Responses for each item were rated on a 5-point scale. A Rasch analysis of the ordinal difficulty ratings was used to estimate interval measures of perceived visual ability for functional vision performance. **RESULTS:** Content validity of the LVP-FVQ was shown by the good separation index (3.75) and high reliability scores (0.93) for the item parameters. Construct validity was shown with good model fit statistics. Criterion validity of the LVP-FVQ was shown by good discrimination among subjects who answered "seeing much worse" versus "as well as"; "seeing much worse" versus "as well as/a little worse" and "seeing much worse" versus "a little worse," compared with their normal-

sighted friends. The task that required the least visual ability was "walking alone in the corridor at school"; the task that required the most was "reading a textbook at arm's length." The estimated person measures of visual ability were linear with logarithm of the minimum angle of resolution (logMAR) acuity and the binocular high contrast distance visual acuity accounted for 32.6% of the variability in the person measure. **CONCLUSIONS:** The LVP-FVQ is a reliable, valid, and simple questionnaire that can be used to measure functional vision in visually impaired children in developing countries such as India.

#### Reprinted courtesy of:

*Invest Ophthalmol Vis Sci* 2003; **44**: 4131-39.



## News from VISION 2020: The Right to Sight

World Sight Day 2003 proved to be the most successful so far. Governments, Ministers of Health and key decision makers showed their support for VISION 2020 and the media coverage was extensive. A full report of all the events that took place is available on the redesigned VISION 2020 website.

The VISION 2020 website which was launched in March is fully accessible to low vision visitors and has new information and links. Partners and supporters of VISION 2020 are encouraged to visit the website and submit articles and comments for inclusion. For more information about VISION 2020: The Right to Sight please visit <http://www.v2020.org> or email [info@v2020.org](mailto:info@v2020.org)