Low vision devices

Arya S K, Kalia A, Pant K, Sood S
Department of Ophthalmology, Government Medical College and Hospital, Chandigarh, India

Abstract
A person with low vision has some useful sight. However, low vision usually interferes with the performance of daily activities such as reading or driving. Because low vision cannot be improved by mere traditional methods (i.e., the use of eyeglasses, contact lenses, etc), persons with low vision often rely on the use of a number of different instruments, called low vision devices, and tailored equipment for improved vision. Low vision devices are described in this article.

Introduction
Low vision is a condition that involves a minimal ability to see (particularly central vision) which is usually 6/18 or worse that is unresolved or uncorrected with traditional eyeglasses, contact lens, intraocular lens implants or corrective surgery. Low vision is not the same as blindness. Unlike a person who is blind, a person with low vision has some useful sight. However, low vision usually interferes with the performance of daily activities such as reading or driving (Liz S, 2008). A person with low vision may not recognize images at a distance or be able to differentiate colors of similar tones.

According to WHO statistics (Resnokoff et al, 2004), there are about 45 million blind and 135 million low-vision individuals, together comprising a total of 180 million visually-impaired people all over the world. A majority (90 %) of these individuals live in the least developed countries. Of the 180 million visually-impaired persons worldwide, 1.5 million are children (0-15 years) who are blind and approximately 5 million children have low vision. There are about 580 million people over the age of 60 years worldwide, of which 355 million live in developing countries like India. WHO estimates reveal that the prevalence of blindness in people aged greater than 60 years in developing countries is 88 % compared to 11.2 % in the developed world.

Although low vision can occur at any stage in life, it primarily affects the elderly. However, low vision is not a natural part of aging. Although most people experience some physiological changes with age (presbyopia), these changes usually do not lead to low-vision. Most people develop low vision because of eye diseases. The common causes of low vision and blindness in the young are retinitis pigmentosa, hereditary macular degeneration, cataract, optic atrophy and glaucoma. Diabetic retinopathy, glaucoma and age-related macular degeneration account for 70 % of the global burden of blindness in the elderly age group. Although, in most cases, persons with low vision have disabled central vision (also called reading vision), there are other types of low vision which may include disabled or partial peripheral vision, disabled or partial color vision, disabled or partial ability to adjust to different light settings and disabled or partial ability to adjust to different contrasts and glaring vision. When vision impairment is recognized early, treatment can be more effective, enabling people to maintain as much independence as possible.
Because low vision cannot be improved by mere traditional methods (i.e., the use of eye glasses, contact lenses, etc), persons with low vision often rely on the use of a number of different instruments, called low vision devices, and tailored equipment for improved vision. Low vision devices, categorized as either optical or non-optical, help to improve visual ability for millions of people everyday.

**Optical devices**

Simply stated, optical low-vision devices involve the use of one of many types of lenses to improve vision e.g. magnifying devices (i.e., magnifying eye glasses, hand magnifiers, magnifying lamps, telescopic viewing devices, etc.), closed circuit television, or CCTV (involves enlarged images, exaggerated contrasts and adjustable magnification).

**Optical devices for distance vision tasks: telescopes**

Distance-vision telescopes are the only optical devices that assist low-vision patients with distance tasks when conventional glasses are unsuccessful. Telescopes improve the resolution of objects by enlarging the image, thus bringing the object closer, i.e. angular magnification. Telescopic lenses are not preferred due to cosmetic reasons and because of restricted field of view.

**Spectacle magnifiers**

These are monocular or binocular convex reading lenses mounted in a standard full diameter or half eye frame. The convex lens functions to enlarge the images on to the retina. The powers range up to + 24 D. They are used for long term reading, writing, needlework, etc. The disadvantage is a requirement of close working distance which may obstruct the illumination and make writing difficult if the lens is stronger than + 10 D.
Glare control devices
Glare is distracting scattered light which can be controlled with devices such as absorptive lenses, tints and ultraviolet and antireflective coatings.

Non-optical low-vision devices
They help bring images closer to the eyes and may include the use of larger print items (i.e., magazines, newspapers, books, calendars, address books, cookbooks, dictionaries, games, playing cards, sheet music, street signs, etc.), larger and illuminated watches and clocks, writing guides and instruments that provide voice instruction (i.e., computers) and instruments that provide voice information (i.e., clocks, timers, calculators, scales, key chains, etc.).

Writing guide
This is very useful for writing on any paper.

Signature guide
This is a rectangular black card with a rectangular cut-out in the middle of the card. This can be a very useful tool for signing on any paper.
Notex
Currency note is placed behind the notex which has seven serrated edges on one side. The first cut indicates Rs 500, second Rs 100, third Rs 50, fourth Rs 10, fifth Rs 5, sixth Rs 2 and the seventh Re 1.

Conclusion
With the availability of a wide range of low-vision devices, people with low vision also can enjoy a near normal life with active vision.

References


Source of support: nil. Conflict of interest: none