

# LOW VISION AND REHABILITATION

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## Introduction

The utmost challenge for an Ophthalmologist or an Optometrist is the management of patients with visual impairment. When medical, surgical or any other interventions are failed to make a difference in the life of a visually impaired individual, the last resource for them is low vision rehabilitation (LVR).

Low vision rehabilitation (LVR) attempts to address the need of individuals with visual impairment through the use of low vision aids, education and training and other interventions. Low vision rehabilitation also helps to teach patients techniques for increasing visual function and performing everyday tasks. One of the most important goals is to increase independence, reduce stress, increase mobility and ultimately, design a plan of action to maintain a stable quality of life, when standard treatments are not an option.<sup>1</sup>

## Definitions

According to International classification of diseases, injuries and causes of death, 10th revision (ICD-10):H54- Low vision is defined as visual acuity of less than 6/18, but equal to or better than 3/60, or a corresponding visual field loss to less than 20 degrees in the better eye with best possible correction (ICD-10 visual impairment categories 1 and 2); Blindness is defined as visual acuity of less than 3/60, or a corresponding visual field loss to less than 10 degrees in the better eye with best possible correction (ICD-10 visual impairment categories 3, 4 and 5).<sup>2</sup>

The World health organization (WHO) working definition of Low Vision (WHO, 1992) is as follows: "A Person with low vision is one who has impairment of visual functioning even after treatment, and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception or a visual field of less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task". In India, Person with low vision means a person with a impairment of visual functioning even after treatment or standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive devices and blindness refers to the following conditions where (i)total absence of sight; or (ii) the visual acuity not exceeding 6/60 or 20/200 in the better eye with correcting lenses; or (iii) limitation of the field of vision subtending an angle of 20°or worse.

## Current status

It has been estimated that about 284 million people are visually impaired worldwide, in which 245 million have low vision and 39 million are blind according to the world health organization (WHO) 2010 data.<sup>3</sup> However the major causes for vision impairment in WHO data are uncorrected refractive error and cataract (curable blindness), the low vision rehabilitation would be mainly useful for the other conditions which are untreatable. There are no accurate data on the prevalence or incidence of vision impairment in India. According to Orbis International, 15 million people are blind and 52 million are visually impaired with a total population of 1.2 billion in India.<sup>4</sup>

The common causes are listed below (table 1)

Adults	Children
ARMD	Heredo macular degeneration
Cataract	Retinopathy of prematurity
Diabetic retinopathy	Syndromes
Glaucoma	Albinism
Retinitis pigmentosa	Vitamin A deficiency

**Causes for low vision**

Evaluation of a patient with low vision: A systematic approach

Evaluation usually starts with a comprehensive low vision history of the patient, that provides essential information on the patient’s visual and medical status. It also focus the problems patient is facing in his or her day-to-day life due to visual impairment and helps to understand the expectations of the patient from low vision rehabilitation service.

A visual acuity evaluation with a logarithmic visual acuity chart such as Bailey-Lovie charts or early treatment diabetic retinopathy study (ETDRS) charts are preferred in order to quantify the residual vision more precisely. Near visual acuity can be measured with single letter text as well as continuous text (reading acuity). Bailey-Lovie chart for near and the Lighthouse continuous text card are the commonly used charts for this purpose. Eccentric fixation positions should be explored and recorded if present. Standard refraction procedures can be followed in case of a clear refractive media.

But most of the cases the retinoscopic reflex will not be clear due to media opacities, in such cases examiner may need to perform radical retinoscopy. If the objective refraction is not at all possible then the determination of refractive error may be accomplished by subjective methods such as bracketing technique and just noticeable difference (JND).<sup>5</sup>

Visual field testing with Amsler’s chart can

provide useful information in cases of metamorphopsia and small central scotomas. Pelli-Robson chart is recommended for contrast sensitivity function evaluation because of its ease and reliability. A variety of tests are available for colour vision testing. Ishihara plates and Farnsworth panel D-15 tests are the main charts used for colour vision testing. This can be followed by binocularity testing and glare testing.

Options available in low vision aids

List of various low vision aids are given in below table (Table 2). Choice and power of the low vision aid is depends on the patient’s need and the conditions of ocular pathology

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Optical Non optical

Hand magnifier Stand magnifier Spectacle magnifier Distance vision telescopes Over head reading lamp Typoscope Felt-tipped pen Reading stand Mobility assistive devices Medical assistive devices Notex and cheque guide Absorptive lenses Assistive and adaptive devices (closed circuit television and computer magnification software)

Visual field expansion with visual aids is useful for conditions like retinitis pigmentosa and glaucoma. This is possible with reverse Galilean telescope, Fresnel prisms, hemianoptic mirror systems and minification with minus lenses.

Vision rehabilitation services

A proper low vision evaluation with

Optical	Non optical
Hand magnifier Stand magnifier Spectacle magnifier Distance vision telescopes	Over head reading lamp Typoscope Felt-tipped pen Reading stand Mobility assistive devices Medical assistive devices Notex and cheque guide Absorptive lenses Assistive and adaptive devices (closed circuit television and computer magnification software)

functional vision assessment (FVA) will help to design a suitable rehabilitation plan.<sup>6</sup> A well designed rehabilitation programme is one that is designed specifically to meet the needs of the individual. A similar degree of field loss or a loss of central acuity caused by identical pathology will not necessarily create the same sense of disability in different people. For this reason, a well structured process of assessment is essential, and must be multidisciplinary and interdisciplinary in nature. Every aspect of a person's life, which they are willing to share, needs to be addressed from both a practical and emotional standpoint.

Functional vision refers to the ability of a person to use vision to perform visual task. It is a property of person and is a function of both eyes. Functional vision is assessed by the ability to perform generic activities of daily living (ADL). It can be assessed either by objectively or subjectively. Objective assessment of functional vision is asking the patient to perform certain tasks. For an example, in visually impaired school going children, the functional vision can be measured by asking the child to read the books. Here it is possible to measure the efficiency of performance such as speed while reading. Whereas subjective functional vision assessment can be performed with the help of vision related quality of life (QoL) questionnaire.<sup>7</sup> Haymes et al. developed Melbourne ADL index in which both subjective

and objective functional vision assessment is included.<sup>8</sup>

Rehabilitation plan usually include instruction in the use of residual visual skills for daily tasks, instruction in the use of visual environmental cues, modification of the visual environment to enhance the use of vision, the use of appropriate psychosocial information to devise motivational strategies to assist in performing desired tasks, and follow-up care to assure that all goals of the rehabilitation plan and the concerns of the patient have been met. In vision rehabilitation programme, the most important problems of the patient to be addressed are practical problems. They include communication (reading and writing), orientation and mobility and daily living skills.

#### Communication

Although learning Braille is essential to the totally blind child in education, modern technology has made the use of Braille largely unnecessary for most visually impaired people. Better optical and electronic magnifiers, recording tapes, computer with large characters or screen readers are available. A screen reader is a software package that enables a speech synthesizer to read aloud the text on a computer screen and enables the visually impaired person to hear what he or she is writing or reading. 'JAWS' (Job Access With Speech) from freedom scientific is an example for screen reader software.

### Orientation and Mobility

Independent travel problem for visually impaired people can be divided in to two parts: Orientation and Mobility. Mobility is commonly thought of as the problem of maintaining a straight and safe path through the environment, avoiding obstacles collisions, drop-offs and excessive veering. Orientation is the more global navigation or way finding aspect of the problem, involving finding one's way from A to B and maintaining a knowledge of where one is and what direction one is facing etc.<sup>9</sup>

Not every visually impaired person needs either a mobility aid or mobility training. This is an area in which individual assessment of need is essential. Rehabilitation workers, who have undergone specialized training, have a wide range of skills and aids at their disposal to enable them to customize a programme for each patient. There are varieties of mobility canes are available such as white walking sticks, light weight simple canes and laser canes etc. The mobility instructor has to show to the visually impaired person how to hold and sweep the cane and has to be supervised first in indoor and then outdoor environment.

### Daily living skills

There are many daily living tasks that create problems for the visually impaired. They range from threading a needle to cooking the food, from addressing an envelope to combing the hair. When there is a difficulty in coping with daily living activities, the rehabilitation specialist has to train the patient on alternate methods, modify environment and educate the patient and family on coping strategies. This approach may lead to increased level of independence, improved safety, increased adequacy of performance and decreased difficulty and increased satisfaction.

The use of assistive technologies and strategies has to be emphasized to the patient. Both visually impaired children and adults

required training for the use of various assistive devices prescribed for them. Successful low vision rehabilitation involves more than prescribing low vision devices as it includes provision of instruction, training, and supportive services to enhance the patient's performance in the ADL skills. The role of rehabilitation specialist is to help the patients to use the devices optimally. It is not the scope of this paper to describe and discuss the details of the many assistive devices known.

### Low vision rehabilitation-

#### A multidisciplinary approach

In many developed countries the vision rehabilitation is a team work in which along with ophthalmologist and optometrist other professionals such as psychologist, psychiatrist, audiologist, social worker, occupational therapist, special educator, orientation and mobility instructor , reading specialist, visual therapist and physiotherapist are also play a major role. In India, major part of the rehabilitation is performed by rehabilitation specialist alone. The role of psychologist and psychiatrist in the management of visually impaired individual with psychosocial problems is well defined. The visually impaired persons need psychological support at two levels in the rehabilitation process: the emotional level and the level of coping with daily activities.<sup>10</sup> They also need counseling in order to have hope for the future in spite of the current changes in their visual status. They need to be informed that there is a possibility of improvement in their quality of life, in spite of their reduced vision. In view of the various psychological factors associated with low vision, the psychologist and psychiatrists are important components of low vision rehabilitation. The other important associated fields involved in the rehabilitation of visual impaired people are social workers, audiologist in case of any hearing impairment and special educators.<sup>11</sup>

Conclusion

The prevalence of vision impairment is likely to increase significantly because the percentage of elderly people, who are most often affected with low vision, is increasing. Along with the identification of visually impaired persons, it is also important to refer these patients in to a well equipped vision rehabilitation centre.

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