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Navigating the Spectrum: Clinical Nuggets in Low Vision Rehabilitation

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Abstract

Low vision rehabilitation (LVR) plays a crucial role in supporting individuals with significant visual impairments that cannot be addressed through conventional interventions such as eyeglasses, contact lenses, medications, or surgery. LVR improves quality of life by making the most of residual vision, which empowers people to become more independent and productive. The evaluation of residual visual function, the recommendation of suitable low vision devices, and training in the efficient use of these devices are essential elements of LVR. This review examines current methodologies and clinical practices in low vision rehabilitation (LVR), providing eye care practitioners with nuggets to enhance patient care and optimize outcomes.

Keywords: Low Vision; Low Vision Rehabilitation; Optical Low Vision Device; Non-Optical Low Vision Device; Magnification

Abbreviations

LVR: Low Vision Rehabilitation; VA: Visual Acuity; LogMAR: Log Minimum Angle of Resolution; ETDRS: Early Treatment Diabetic Retinopathy Study; JND: Just Noticeable Difference; LCVA: Low-Contrast VA Charts; BAT: Brightness Acuity Tester; LV: Low Vision; VF: Visual Fields.

Introduction

Envision living in a world where even seemingly easy things, like reading a book or recognizing a loved one's face, become difficult undertakings. This is the reality for millions living with low vision, a condition that extends beyond visual impairment to impact every aspect of daily life. Encountering a patient whose vision cannot be further improved may lead to feelings of inadequacy as a clinician. However, there are various strategies exist to support individuals with low vision [1]. Effective support begins with a thorough understanding of low vision and the fundamentals of low vision rehabilitation.

Low vision refers to a visual impairment that limits one's capacity to carry out daily visual tasks [2]. According to the World Health Organization, a person with low vision is someone who experiences a persistent impairment in visual functioning despite treatment and/or standard refractive correction. This condition is defined by a visual acuity of less than 6/18 down to light perception in the better eye or a visual field of less than 10 degrees from the point of fixation, but the individual is still able, or has the potential, to use their vision for planning and carrying out tasks that rely on visual input [3]. Numerous eye conditions can contribute to low vision. Common causes for vision loss or impairment include eye injuries, genetic conditions, infections, glaucoma, age-related macular degeneration, corneal opacity, diabetic retinopathy, and albinism, among others. The resulting vision loss is irreversible and necessitates low vision rehabilitation [4].

Low vision rehabilitation is a multifaceted field that intersects clinical expertise, technological advancements,

and patient-centered care. Low vision rehabilitation can be conceptualized as a continuum that starts with optical and/or medical and surgical intervention (if required), continues with the prescription of low vision devices, and ends with the essential vision rehabilitation services. Enhancing the person's capacity to function as independently as is feasible using a range of techniques is the aim of comprehensive vision rehabilitation [5]. Vision rehabilitation seeks to optimize the use of the remaining vision and facilitate practical adaptations to mitigate the psychological, social, emotional, and economic impacts of visual impairment [6]. Its primary objectives are to increase the independence and participation in daily activities of individuals with low vision, thereby improving their overall quality of life [7]. Low Vision rehabilitation can be considered from two perspectives: a) Low Vision Assessment and b) Low vision Management [8].

Low Vision Assessment

It is significant to note that the evaluation of a visually impaired patient by an Optometrist or Ophthalmologist differs significantly from a typical or standard examination in an eye clinic. It is recommended that eye care providers, particularly those involved in low vision rehabilitation, be ready to dedicate two or three times as much time as they would for standard eye exams [9]. It is also important for eye care practitioners to know that patients should be encouraged to seek low vision services as soon as they are needed, rather than waiting until they experience severe visual impairment, as this can achieve better outcomes [8]. Low Vision Assessment consists of a protocol made up of various steps that serve as a guide to the practitioner.

The Low Vision Examination Protocol

The low vision examination protocol typically involves several steps designed to thoroughly assess the visual capabilities and needs of a patient with low vision. These steps include identifying beneficiaries for low vision rehabilitation, observation, review of medical records, detailed case history, visual function assessment, careful refraction and magnification requirement [1]. This protocol ensures a comprehensive evaluation and tailored intervention plan to maximize the functional vision and quality of life for individuals with low vision.

Identify Beneficiaries for Low Vision Rehabilitation

The term "clinical low vision service," which is frequently used to refer to eye care programs, may imply that all other evaluations and treatments, including surgery or refraction, have already been completed. However, that may not always be the case. Before conducting any low vision exams, it is important to make sure that the person with impaired vision has had a comprehensive eye checkup and that low vision services are indeed required [10]. In some cases, the diagnosis may have been established, but the refraction might not have been performed accurately. This might have occurred due to insufficient time allocated for the refraction process or because the optometrist expected or noticed only slight improvement. It is vital to understand that, for someone with impaired eyesight, any improvement in visual acuity is significant. Before conducting a low vision assessment, it is essential to first perform a comprehensive eye examination and provide any required medical, surgical, or optical treatments [11]. To avoid unexpected visual complications, clinicians must stay updated on the latest advancements in ocular surgery and medical treatments for ocular diseases [12]. In addition, the following questions must be clearly answered before a patient begins low vision therapy.

- Was the patient's diagnosis verified by an eye care practitioner?
- Have all appropriate medical, surgical, and ocular treatments already been provided?
- Has the prognosis for vision been verified by an eye care practitioner?

If a person responds negatively to any of these questions, they should be referred to the appropriate practitioners for management, whenever possible [1].

Observation

When a patient has been identified to require low vision rehabilitation and is present in the clinic for assessment, the eye care practitioner should closely observe the individual for the following: i). The ability to navigate his or her visual environment and complete near, intermediate, and distance tasks. ii). Interaction of the patient with family members or caregiver iii). The presence of head turns or tilts, cautious walking, staying close to walls or railings, clinging to others (usually associated with peripheral field loss), altered posture and movement, nystagmus, oculo-digital syndrome, as well as maintenance of eye contact when responding to inquiries [9].

Review of Medical Records and a Detailed Case History

The examination of previous surgical and medical records of the patient is crucial to identify any potential treatable causes of LV that may have gone unnoticed [13]. History taking is a vital part of the low vision assessment as it presents an opportunity for the eye care practitioner and the patient to be better acquainted with each other. It is ideally not the avenue to diagnose the condition as is expected in routine eye examinations because the diagnosis has also been known to the practitioner before the commencement of the low vision assessment. Rather, this step helps to determine

the patient's needs and best form of management. During history taking, the patient should be encouraged to share their concerns. It is helpful to ask open-ended questions, which do not elicit simple "yes" or "no" answers, and start with words like "when," "what," "how," and "where"[1]. In addition, the patient and/or the patient's parents or caregivers, if the patient is a minor, may be questioned about the patient's visual and medical health, including the dates and locations of any prior eye care appointments and low vision exams. If available, this information may also be discovered in the medical records. Assessing the patient's objectives and visual needs are also important. To get a sense of the current situation, more detailed information about the patient's use of vision in relation to everyday living activities, work, mobility, and educational duties is crucial [11,14]. It is often best to start the conversation on a positive note by inquiring about the activities they can still perform. Then, discuss any potential areas where they may be experiencing difficulties [1]. Since some individuals with low vision may not have had their eye problem explained to them or may not have comprehended the explanation, the history also offers the chance to clarify the condition to the patient [1]. By the end of history taking, the eye care practitioner can assess how much time to allocate to the patient and understand the patient's response to vision loss, as well as evaluate the feasibility of the patient's aims and goals [9].

Visual Function Assessment

The evaluation of visual function encompasses the following: Visual acuity (VA) for distance and near, refraction, contrast sensitivity, visual fields, light sensitivity or brightness acuity, and color vision. If formal tests are not available, the last four areas of visual function may be assessed informally using real-world activities [11]. Nevertheless, accurately and precisely testing visual acuity, even in lower acuity ranges, remains crucial for several reasons, such as quantifying the amount of residual vision, evaluating ocular function, assessing the stability and progression of a visual condition, determining the magnification requirement to prescribe appropriate low vision aids and strategies [12].

Visual Acuity

The Log Minimum Angle of Resolution (LogMAR) charts (Figure 1) provide more accurate measurements of visual acuity, hence they are the preferred methods when assessing a person with low vision at a distance. This is because the majority of the specifications for a LV chart are met by the LogMAR test charts, which include high contrast, proportional spacing of optotypes, geometric progression of a size difference between lines, a constant number of letters in each row, and the ability to test at nonstandard testing distances of 4 metres or closer. Some examples of the LogMAR charts available include the Early Treatment Diabetic Retinopathy Study (ETDRS) charts [15], Landolt rings, High-Contrast Bailey-Lovie Chart, HOTV, Lighthouse distance VA charts (Sloan letters), and LEA Symbols Chart [16]. If an individual is unable to read the top line of letters at 3 or 4 meters, lower testing distances, such as 2, 1 meter or even 0.5 meter, may be employed [1]. Next, based on the smallest line the patient can read (e.g., 0.5/24), the VA is recorded. The LogMar score needs to have a correction factor of 0.3 added when the distance is halved. The eye care practitioner should test for hand movement and light perception if VA is below this threshold. Multiple pinhole measurements of distance VA are necessary to detect any refractive errors. It is important to evaluate fixation since missing letters or symbols may indicate loss of the visual field, and eccentric fixation may imply loss of the central field [9]. In addition, near visual acuity is also necessary for assessment in order to prescribe low vision aids for close work if required. LogMAR near charts, as well as other charts such as LEA Symbols, Minnesota LV reading chart (MNREAD) card, Lighthouse Continuous Text Card, Lighthouse "NUMBER" card, and Lighthouse Near VA Test Chart (Modified ETDRS with SloanLetters) can also be used to measure near visual acuity [1,17,18]. It is crucial to evaluate everyone's near visual acuity, not just those who are literate, because a wide range of other occupations require clear close-up vision. Single letters, solitary words, or brief sentences could be used in these charts. However, reading proficiency may be measured more precisely using brief sentences or continuous text than with single optotypes [9]. Near VA charts are usually set in meter equivalents, or M units as it makes it easier to calculate magnification. VA is usually recorded as a fraction with the numerator as the reading distance in cm and the print size in M units as the denominator, e.g. 40/4M. It is also important to record the distance and the smallest print read. The use of an overhead reading lamp to increase contrast can be employed to improve the reading distance and/or print size that can be read [9].

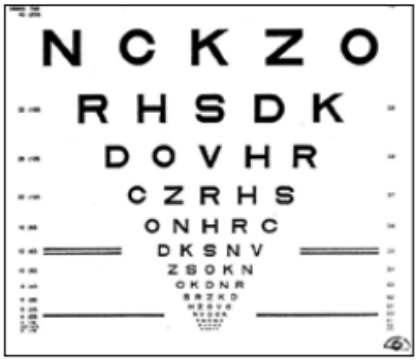

Figure 1: The logMAR chart is characterized by a standardized letter size progression, uniform line and letter spacing, and a constant number of letters on each line [1].

Accurate Refraction

It is imperative to note that precise refraction is crucial for low vision rehabilitation in order to maximize visual performance. The optimum refraction process includes both subjective and objective refraction, through which distance visual acuity, can frequently be significantly enhanced. Spectacle or contact lens correction may be beneficial for those with low vision, as they also frequently have uncorrected refractive error [12]. Refractive errors, which are usually high, can cause people who were previously thought to have low vision to really have normal vision only when they wear distance glasses. Refracting individuals with low vision is different from refracting individuals whose vision can be raised to normal (6/6 or 20/20), as the former may respond considerably more slowly and is less sensitive to slight variations in the adjustments in the power of trial lenses). Fatigue and discouragement can adversely affect refraction results, so it is important for the patient is seated comfortably and given time to recover from any signs of stress or tiredness [1].

To utilize a magnifier, the majority of patients with refractive errors must also wear their distance glasses [11]. The practitioner needs to have patience while carrying out refraction because impatience and exhaustion might have a detrimental impact on the result [9]. The test chart should be positioned so that the patient can see at least the top line of letters when refraction is being carried out. Phoropters are not recommended for use in LV patients, rather the use of full aperture trial lenses and trial frames are considered more effective. This is because patients with field defects can employ eccentric head or eye postures to read the chart [9]. Standard retinoscopy is performed using any method. If the media is not clear, retinoscopy is done at closer distances less than 50cm. This method is referred to as radical Retinoscopy [9]. Patients with poor visual acuity may struggle to detect small changes in lens power and clarity, making it often necessary to implement significant power adjustments [1]. The use of the Just noticeable difference (JND) and Bracketing method [13] can be applied.

The Just Noticeable Difference (JND) is the smallest variation in spherical lens power required to detect a change in clarity or blur. The lower the visual acuity, the greater the JND [19]. The JND for a working distance of 20 feet is calculated as the Snellen acuity denominator divided by 100. For instance, if the visual acuity (VA) is 20/400 and the JND is 4 diopters (D), a +2.00DS trial lens would be compared to a -2.00DS trial lens. If the patient can distinguish between the two, they can add the lens with improved vision and continue the process with +1.00DS and -1.00DS lenses, respectively [1]. The optimal spherical lens power is determined by bracketing with stronger and weaker lenses, allowing for a relatively accurate and reliable assessment of refractive error in patients with significant loss of blur sensitivity [9]. Near VA is frequently enhanced with spectacles recommended for distance VA. Determine the required near addition lens and the working distance at which the patient feels comfortable. The best corrected visual acuity at both distance and near must be recorded [1].

Contrast Sensitivity

The ability of the eye to distinguish subtle variations in brightness or variations in the greyness of the backdrop is measured by contrast sensitivity. Contrast sensitivity is the ability to detect objects with low contrast and is the reciprocal of contrast threshold. The contrast threshold is the minimum level of contrast required to view a target [20]. There is moderate to low levels of contrast over most areas of our planet [1]. Thus, contrast sensitivity is a more accurate predictor of real-world performance [20]. For instance, someone with a visual acuity of 6/36 may perform many jobs effectively but struggles in low light conditions, possibly due to reduced contrast sensitivity [1]. Because contrast sensitivity is typically reduced in patients with LV, contrast sensitivity testing is essential in the management of low vision problems, to determine if higher magnification, more lighting, or contrast-enhancing measures will be required [12].

Compared to high-contrast VA charts, low-contrast VA charts have a better connection with reading, driving, or facial recognition in numerous neurologic diseases [21]. Examples of contrast sensitivity test charts that can be used are the Pelli-Robson Chart and low-contrast VA charts (LCVA) [22].

Light Sensitivity or Glare Test

Glare is frequently produced by light scattering within the eye, and people with anterior segment disease (which affects the cornea, iris, or lens) have difficulty seeing in bright light. The vision of a person with low vision can be influenced by both insufficient light and excessive light (glare). Bright light, such as that reflected from a slick blackboard or tabletop, makes it difficult for those with heightened light sensitivity to see. It can be quite challenging to distinguish things or persons in the face of such intense light, or glare, because contrast is diminished [1]. When excessive glare is one of the complaints, brightness acuity testing is advised during the low vision evaluation [12]. The Brightness Acuity Tester (BAT) can be used to subjectively evaluate the effects of glare on visual performance. The patient reads the distance ETDRS chart through the BAT aperture, using the best subjective distance correction, at low, medium, and high light levels, while the other eye is closed. A decrease of two or more lines in visual acuity indicates that glare considerably hinders visual performance under bright lighting. Different absorptive filters can then be tested to determine if they help reduce glare [23].

Visual Fields

Low vision (LV) testing of visual fields (VF) provides several benefits. It helps determine how a patient with low vision manages daily activities, it assesses the effectiveness of various rehabilitative approaches for the patient and it evaluates whether the patient meets the criteria for legal blindness especially in conditions with peripheral field loss such as advanced Glaucoma and Retinitis Pigmentosa [1,24]. Ideally, the patient's visual fields should have been evaluated by the eye care practitioner making the diagnosis as part of their clinical evaluation. If not done, a variety of tests can be used, such as confrontational testing, static testing (Friedmann or Humprey Visual Field Analyzer), and dynamic testing (tangent screen or Goldmann tests). It is recommended that individuals with low vision assess their binocular visual fields using the Esterman program, which is accessible in the Humphrey Visual Field Analyzer. This gives a more accurate picture of the patient's difficulties with movement, driving, and other daily tasks. In cases, where patients with low vision find it challenging to perceive the standard Goldmann size III stimulus used during perimetry in the Humphrey Visual Field Analyzer, switching to the larger stimulus size V is often preferred [25,26].

On the other hand, to evaluate areas of substantial vision loss within the center 20° of the visual field (central field loss), the Amsler grid test is a valuable tool [1]. It is widely used to assess the integrity of the central visual field especially for conditions such as Age-Related Macular Degeneration and inherited Macular dystrophies [1].

In using the Amsler Grid, some patients may experience smaller scotomas when viewing the grid binocularly compared to viewing with each eye separately, while others may have larger scotomas. The test also helps measure scotomas, pinpoint their locations and identify the dominant eye. This information is useful in the selection of appropriate low vision devices for each individual [24].

Colour Vision Test

Color vision testing reveals the degree of difficulty a patient may have processing color information for tasks that are necessary for daily living, such as matching clothes or identifying traffic signals [26]. People with low vision are more likely to experience reduced colour vision. This can be evaluated by posing queries like: do you have trouble matching your clothes? Is it hard to distinguish between different colour shades? The Ishihara, pseudoisochromatic color plates, the Farnsworth dichotomous test (D-15), and the Farnsworth Munsell 100 hue test are examples of common testing methods. For blue-yellow dyschromatopsia, which is more common among people with LV, color arrangement tests such as the Farnsworth 100 Hue and D-15 tests or the Wang and Wang color vision plates are more suited than the Ishihara tests [14,27]. However, in clinical assessment, it is often suffices to determine if the individual can distinguish between primary colors-red, green, and blue-or match them [1].

Magnification Requirement

Magnification is beneficial for many people who have low vision, although it has its drawbacks. In order to provide the patient with reasonable expectations about what is feasible, it is important to comprehend the constraints and convey them to the patient [1]. There are four types of magnification that are used in low vision management. These are:

Relative Size Magnification

This type of magnification is achieved by increasing the size of an object, such as large print textbooks [9].

Relative Distance Magnification

This type of magnification is accomplished by bringing the object of interest closer to the eye and projecting a bigger picture onto the retina. The magnification is inversely proportional to the difference from the initial distance [9].

Angular Magnification

This magnification refers to the perceived shift in size of an object. Magnifiers and telescoping devices are commonly used to achieve this magnification [9].

Projection Magnification

This is produced by electronic magnification devices and computer software, which not only expand the objects but also increase their contrast [9].

Magnification assessments are required for near tasks like reading and using cell phones, as well as for far tasks like reading the board in the case of students [11]. The precise magnification required will depend on the individual's visual needs, surroundings, and the selected low vision device. Nonetheless, this provides a helpful starting point for choosing low vision devices to test [1]. Several formulas could be used to estimate the magnification needed [27], however, there is a formula that can be applied easily and quickly in the clinic to estimate the amount of near magnification a person may require. This formula can be expressed as

$$\text{Magnification needed} = \frac{\text{Near acuity achieved at 25cm}}{\text{Required near acuity at 25cm}^{1}} \quad [1]$$

The first step in determining the required magnification is to assess the person's near acuity at a distance of 25 cm. This involves ensuring they are wearing their distance

prescription (if any) and having them hold a reading chart with sentences at that distance. If necessary, plus lenses can be added to both eyes, especially for elderly people to enable accommodation at 25cm. The person's near acuity is indicated by the smallest text they can read swiftly and comfortably [1].

To ensure comfortable reading at 25 cm, the next step is to calculate the needed near acuity and determine the ideal font size by asking the person what they would like to read. For example, if the person wants to read a Newspaper print, then the needed near acuity at 25cm would be 1.6M or if it is a child who wants to read his or her school books, the needed near acuity at same distance would be 2.5M.

Use the same notation as in the initial step to record the needed text size. Focus on finding a font size that allows them to read comfortably and quickly, making it easier to choose the appropriate magnification level [1]. Table 1 shows the various text sizes in M and N notation (at both 25 and 40cm).

M (40cm)	M (25cm)	N	Standard Text Type
2	3.2	16	Large print
1.6	2.5	12	Children's books
1.25	2	10	Paperback print
1	1.6	8	Newspaper print
0.8	1.25	6	Magazine print
0.6	1	4	Footnotes

Table 1: Sizes of texts in M and N notation (at 25 and 40 cm) [1].

Finally, to determine the required magnification, divide the near acuity attained at 25 cm by the required near acuity at 25 cm. For example, if the needed near acuity is 1M and the attained near acuity is 2M, two times the magnification is needed.

To find the dioptres needed to reach this magnification at 25 cm, apply the formula: dioptres equals magnification times 4. An 8 dioptre lens would be required to produce 2x magnification at 25 cm (2 x 4 = 8D). The magnification is generally indicated for a reference distance of 25 cm, so if dioptres are not provided, refer to the device packaging [1].

The test distance of 25 cm is used instead of 40cm because moving objects nearer increases visibility and contrast, which is critical for people with low vision. In addition, knowing the required magnification at 25 cm simplifies the computation of the necessary diopters [1].

It is important to note that the higher the magnification, the smaller the lenses. A large lens cannot be found on a very high-powered magnifier! Magnifiers with higher magnifications exhibit greater distortion along the lens edge, resulting in only clear vision through the lens center. As a result, even though the word or object appears larger, only a few letters or a small portion of it is seen at any given moment.

This slows down reading and/or working speed. So, it is advised to utilize the least magnification that can be used comfortably for an extended period [1].

Low Vision Management

The second aspect of low vision rehabilitation is the management of the low vision patient. This typically takes place after the low vision assessment has been carried out.

It involves drawing up a management plan based on the information obtained about the person during the low vision assessment. For effective low vision management, the individual's needs, which depend on their background, physical ability, residual vision, and desired outcomes should be considered [1]. Some possible recommendations are as follows.

Use of optical low vision devices for distance or near vision.

Use of non-optical interventions such as glare-reducing headwear, a reading stand, a reading guide, various lamps, filters, sunglasses, etc.

Environmental modifications like painting lines on steps or using contrasting colors throughout the home [1].

Low Vision Devices

The main premise of LVDs is to modify the perception of the environment [29] by making objects appear closer, larger, brighter and darker. They also improve the color and contrast of objects. LVDs are categorised into four types [30,31]. These include:

Optical Low Vision Devices

These are devices that incorporate one or more lenses positioned between the eye and the object being observed, to achieve optical magnification (Figure 2).

These devices employ one of the four types of magnifications (angular magnification) or a combination of them [30]. Examples are devices for near tasks - magnifiers (Figure 2a) which can be prescribed as spectacle, handheld, and stand (with or without inbuilt illumination) and devices for distance tasks - telescopes (Figure 2b), which can be prescribed as monocular (handheld or spectacle-borne) or binocular [1].Telescopes with adjustable focus capabilities can also be utilized effectively for intermediate and near

tasks [31].

a). 

b). 

Figure 2: Optical devices
a) Microscopes and various types of magnifiers: hand-held, stand and dome magnifiers.
b) Telescopes: Hand-held, spectacle mounted and clip-on type [32].

Electronic Devices

These LVDs use electronic approaches to accomplish magnification. Electronic devices are often the choice of LVD for individuals with significant vision impairment. They utilize a zoom camera to enlarge materials on a digital screen [1]. To accommodate particular visual requirements, images can be enlarged, and digital contrast adjustments can be made to reduce eye strain while reading. They can be in (a) portable or (b) desktop form (Figure 3).

a). 

b). 

Figure 3: Electronic Devices
a) A portable video magnifier.
b) Desktop Video magnifiers [33].

Non-Optical Low Vision Devices

These are LVDs that do not employ optical lenses (Figure 4). They are designed to support independent living by modifying perception through improved illumination, contrast, and spatial relationships. The phrase 'Bigger, Bolder, Brighter' captures the essence of these technologies. Examples include the use of larger print books, improved contrast, bright color schemes, writing larger text and numbers on the white or blackboard, a closer working distance, and enhanced (or occasionally decreased) illumination [1]. Others are check registers, writing guides, bold-lined paper, needle threaders, magnifying mirrors, and high contrast watches. To effectively advice on non-optical LVDs, a variety of methods should be employed to demonstrate and teach their use. Any properly trained eye care professional can provide this guidance. The use of larger print books, improved contrast, bright color schemes, writing larger text and numbers on the white or blackboard, a closer working distance, and enhanced (or occasionally decreased) illumination are examples of non-optical interventions [1].

Figure 4: Various non-optical Low Vision Devices [33].

Advanced Technological Devices

These devices utilise complex technologies such as the Job Access with Speech (JAWS) screen reading software which turns a standard PC into a talking computer, whilst Zoom Text is screen magnification software. Other software includes the Zoom and Voice Over app and other accessibility features that can be found in smart devices [30,31]. It is important to note that the higher the magnification, the smaller the field of view (Figure 5), the working distance decreases, and the depth of field is also reduced. Thus, the selection of the optical LV device will depend on these factors and not only on the level of magnification targeted [31].

Figure 5: A larger magnification results in a smaller field of view (right) [1].

Selection of Low Vision Devices

Selection of the right type of low vision device is key to meeting the goals of the patient and as well as improving the quality of life of the individual [1,27]. However, the following factors need to be considered when selecting low vision devices.

- Visual abilities of the patient
- Task(s) to be carried out
- Time for completion of task
- Physical condition of the person
- Availability of the device
- Acceptability of the device
- Cost
- Ease of use [27].

Guidance and Training in the Utilisation of Devices

Following the low vision clinic assessment and management, which may include prescription of LVDs, the patient and family should be consulted about the need for additional training or assistance [1]. Teaching the patient how to use prescribed devices correctly, matching device and task, and informing the patient and family are all crucial steps in the management of low vision [12]. It is crucial to show the patient the benefits of improved visual acuity through practical tasks, like the ability to read text in a schoolbook with the newly prescribed magnifier or the ability to read what is written on a poster in the eye clinic. Improvements

achieved with the visual acuity chart may mean little to patients or their families [27].

Managing the Patient's and Their Family's Expectations

It is important to state that the expectations of the low vision patient and his or her family must be managed well. This is because the loss of vision for many people can be distressing and terrifying, causing them to be anxious about losing their independence and feeling less valuable. Most often, patients typically come to the low vision practitioner with minimal knowledge about their diagnosis and prognosis. Low vision rehabilitation specialists must manage unrealistic expectations without depriving patients of hope. The success of the visually impaired patient depends on providing them with realistic options for independence and education about their eye conditions [34].

The purpose of the low vision examination is to assess the patient's ability to carry out everyday tasks in spite of their vision impairment. Patients need to be aware that they cannot expect to carry out their responsibilities in the same way since they do not have the same vision as they did previously but while they can function, they also need to be adaptable. When discussing solutions, it is important to work on one task at a time, such as reading, and present all options in that power. The patient should work with all options to decide on the best solution for their needs. If a second visit is needed, realistic expectations and solutions should be reviewed again [34]. Patients may not understand optics, medical or technical explanations, so it is important to discuss things in a language that the patient and the caregiver can understand. This can be visual or verbal, and if the patient cannot see the material, they can use a video magnifier to enlarge it [34]. Acceptance of vision loss and low vision rehabilitation is facilitated by providing the patient and their family with appropriate education. The patient will succeed because they will stop searching for a magical cure or spectacles once they fully comprehend their options [34]. Furthermore, low vision rehabilitation requires a multidisciplinary approach to address not only the visual issues but also the disability and psychological challenges resulting from vision loss [9,35]. Hence, eye care practitioners, particularly those involved in low vision rehabilitation, ought to be aware of the various specialist and community-based services that persons with low vision may require and refer appropriately as the case requires.

Professional Ethics in Low Vision Rehabilitation

Certain professional ethics should be applied when assessing and managing patients with low vision in the clinic. Knowledge and application of these guidelines would ensure both the practitioner and the patient get the best out of the meeting.

- It is recommended to inquire with the patient about their preference for companionship or solitude.
- Address the patient directly rather than the person who is with them, even when speaking with teenagers or younger patients.
- Examine your case notes and ensure you have the necessary information before the discussion.
- Introduce each individual (eye or health care personnel) in the examination room to the patient and caregiver.
- Obtain the patient's permission first, before speaking with students or colleagues present in the examination room.
- Before you touch or assist a patient, get their consent.
- Meeting their eyes directly will help them hear you more clearly, even if they are blind. Their caregiver(s) will notice.
- Speak simply, ensure comprehension, and gauge emotions of the patients.
- Share knowledge about recent findings to inspire hope.
- Hold tissues close at hand.
- Hold off on rushing the discussion.
- Respond to each person's concerns without being callous or apathetic. It is not appropriate to tell a patient they just need to adjust.
- Refrain from telling patients and caregiver (if present) that there is no further action available rather offer further details regarding the services that they could benefit from.
- Don't extinguish hope, but don't offer false hope either.
- Avoid taking anger personally.
- Don't frighten people; instead, gradually convey the nature of the examination as you proceed [36].

Conclusion

This review sheds light on the invaluable clinical insights that shape the landscape of low vision rehabilitation, emphasizing the importance of personalized approaches and holistic care for individuals with visual impairments. Application of these guidelines in the low vision clinic would ensure increased uptake of low vision services and better patient outcomes.

Conflict of Interest

There is no financial interest or conflict of interest.

References

1. Gilbert C, Dijk KV (2012) When someone has low vision. Community Eye Health 25(77): 4-11.

2. Verezen A (2009) Eccentric Viewing Spectacles including an Introduction in Low Vision Rehabilitation.

3. World Health Organization (1993) The management of low vision in children. Report of a WHO consultation: Bangkok, July 1992. Geneva: World Health Organization.

4. Mandal A (2024) Causes of Visual Impairment. News Medical Life Sciences.

5. Marg LP, Hills B (2004) Setting up Low Vision Care services in the developing world. Newsletter.

6. American Optometric Association (2020) Evidence-Based Clinical Practice Guideline Comprehensive Adult Eye and Vision Examination. Optometric Clinical Practice.

7. American Optometric Association (2024) Low vision and low vision rehabilitation.

8. The College of Optometrists (2024) Knowledge, Skills and Performance.

9. Tripathi A, Agarwal R (2022) An updated approach to low-vision assessment. Journal of Clinical Ophthalmology and Research 10(3): 137-143.

10. Fontenot JL, Bona MD, Kaleem MA, McLaughlin WM, Morse AR, et al. (2018) Vision rehabilitation preferred practice pattern®. Ophthalmology 125(1): P228-278.

11. Dijk KV, Kishiki E, Courtright P (2014) Low vision care in Africa: Practical approaches to clinical services, educational engagement and planning.

12. Bona MD (2016) 7 Tips for Successfully Managing Patients with Low Vision. Education.

13. Fraser KE, Cole RG, Faye OE, Freeman PB, Goodrich OG, et al. (1997) Optometric Clinical Practice Guideline Care of the Patient with Low Vision. American Optometric Association Consensus Panel on Care of the Patient with Low Vision.

14. Markowitz SN (2006) Principles of modern low vision rehabilitation. Can J Ophthalmol 41(3): 289-312.

15. Kaiser PK (2009) Prospective evaluation of visual acuity assessment: a comparison of snellen versus ETDRS charts in clinical practice (An AOS Thesis). Transactions of the American Ophthalmological Society 107: 311-324.

16. Shamir RR, Friedman YG, Joskowicz L, Mimouni M, Blumenthal EZ (2016) The influence of varying the number of characters per row on the accuracy and reproducibility of the ETDRS visual acuity chart. Graefe's Archive for Clinical and Experimental Ophthalmology 254(5): 971-976.

17. Radner W (2017) Reading charts in ophthalmology. Graefe's Archive for Clinical and Experimental Ophthalmology 255(8): 1465-1482.

18. Subramanian A, Pardhan S (2006) The repeatability of MNREAD acuity charts and variability at different test distances Optom Vis Sci 83(8): 572-576.

19. Jackson AJ, Wolffsohn JS (2007) Low Vision Manual. Elsevier Health Sciences.

20. Chung ST, Legge GE (2016) Comparing the shape of contrast sensitivity functions for normal and low vision. Investigative ophthalmology & visual science 57(1): 198-207.

21. Stellmann JP, Young KL, Pöttgen J, Dorr M, Heesen C (2015) Introducing a new method to assess vision: computer-adaptive contrast-sensitivity testing predicts visual functioning better than charts in multiple sclerosis patients. Multiple Sclerosis Journal-Experimental, Translational and Clinical 1: 2055217315596184.

22. Thayaparan K, Crossland MD, Rubin GS (2007) Clinical assessment of two new contrast sensitivity charts. British Journal of Ophthalmology 91(6): 749-752.

23. Shah P, Schwartz SG, Gartner S, Scott IU, Flynn Jr HW (2018) Low vision services: a practical guide for the clinician. Therapeutic advances in ophthalmology 10: 2515841418776264.

24. Crossland M, Rubin G (2007) The Amsler chart: absence of evidence is not evidence of absence. British Journal of Ophthalmology 91(3): 391-393.

25. Morgan AM, Mazzoli LS, Caixeta-Umbelino C, Kasahara N (2019) Expediency of the automated perimetry using the goldmann V stimulus size in visually impaired patients with glaucoma. Ophthalmology and Therapy 8(2): 305-311.

26. Sood D, Czanner G, Somerville T, Sood I, Rowe FJ (2021) Standard automated perimetry using size III and size V stimuli in advanced stage glaucoma: an observational cross-sectional comparative study. BMJ open 11(9): e046124.

27. LV Prasad Eye Institute (2014) Reference Manual: Low Vision Rehabilitation. LV Prasad Eye Institute, Hyderabad, India.

28. Şahlı E, İdil A (2019) A common approach to low vision: examination and rehabilitation of the patient with low vision. Turkish journal of ophthalmology 49(2): 89-98.

29. American Academy of Ophthalmology (2024) Low-Vision Aids.

30. Minto H, Butt IA (2004) Low vision devices and training. Community Eye Health 17(49): 6-7.

31. Agarwal R, Tripathi A (2021) Current modalities for low vision rehabilitation. Cureus 13(7): e16561.

32. Vasconcelos G, Fernandes LC (2015) Low-Vision Aids. American Academy of Ophthalmology.

33. Singapore National eye Center (2024) Resources for People with Low Vision.

34. Noon LP, Shuldiner RJ (2024) Educating Patients and Their Families about Low Vision and Low Vision Solutions. International Academy of Low Vision Specialists.

35. Wilkinson ME, Shahid KS (2018) Low vision rehabilitation: An update. Saudi Journal of Ophthalmology 32(2): 134-138.

36. Jolly JK, Shuldiner RJ (2024) Advice on Addressing the Emotional Impact of Low Vision. International Academy of Low Vision Specialists.