



## Low Vision in Children: Adaptation Versus Prescribing Devices

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### Abstract

Low vision in children is a major issue creating havoc in normal child growth. It needs to be understood in detail in order to be managed. The present article discusses various conditions causing low vision in children, the prevalence of visual impairment, adaptation to low vision, clinical objectives of low vision care, low vision aid according to life stages, and rehabilitation.

**Keywords:** Low Vision; Paediatric; Adaptation; Devices; Vision Rehabilitation

### Introduction

Visual Impairment due to preventable blindness are also seen to be affecting children. It is important to identify the conditions leading to blindness and those leading to Low Vision. As in Children, if these conditions are identified at earliest, Low vision management can be given and even rehabilitation can be opted at an early stage This would help the child live an independent life and not being dependant on the sighted peer. Thus it is important to know the aetiology, prevalence and impacts of low vision in children.

### Discussion

#### Prevalence of visual impairment

Visual impairment in kids throughout the world changes generally, the by and large pediatric visual deficiency pervasiveness rate has been assessed at about 0.7 per 1000 kids, according to which 1.5 million visually impaired kids around the world. Around 66% of these kids are Asian, with around 0.25 million in India [3].

Earlier studies suggest drastically increase in the Prevalence of Low Vision World wide.

#### Conditions causing low vision in children

Numerous juvenile diseases, including albinism, paediatric cataracts, paediatric glaucoma, nystagmus, high refractive errors, trauma, and anomalies of the retina and optic nerve, can cause low vision. Some of these problems may worsen throughout life, and many of them are irreversible [4]. Retinal illnesses, nystagmus, and macular problems are among the frequent causes of visual impairment in children with impaired vision, according to Mufarriq Shah, *et al.* Refraction and poor vision services aid visually challenged children, especially those with inherited or congenital ocular defects. These services support vision improvement and inclusive education.

Uncorrected refractive error in childhood was the root cause of impaired vision in 14 out of 25 kids and blindness in one out of three kids. Monocular poor vision was most frequently caused by refractive error in all groups [15].

In the past In the paediatric population, poor eyesight has a wide range of etiologies. For instance, childhood poor vision may result from another visual disorder or from a fundamental underlying visual irregularity. It might develop as one of the ophthalmologic symptoms of a genetic or underlying illness, or it could be brought on by a brain visual impairment (CVI). Nystagmus, optic decay, optic nerve hypoplasia, and CVI are the most common causes of paediatric poor vision, according to restricted epidemiologic evidence [15].

Among Indian children, the following conditions were found to be the main causes of severe visual impairment and blindness: corneal staphyloma, scar, and phthisis bulbi (mainly caused by a vitamin A deficiency), microphthalmos, anophthalmos, and coloboma, retinal dystrophies, and albinism, cataract, uncorrected aphakia, and amblyopia [21].

### Adaptation to low vision

The life stage at the onset of visual impairment and life stage at the time of low vision intervention affect the adaptation to vision loss as well as adjustment to the low vision aid. The child with congenital visual impairment easily learns to adapt to tasks of daily living as they do not have any previous visual experience. Due to adaptation to visual loss and acknowledgment of the condition, the child with congenital vision loss easily develops self-confidence and self-esteem as compared to a child with adventitious vision loss. The attitude of family, teachers, and society may impact a child's adaptation to vision loss [10]. Children with low vision have a reportedly higher incidence of mental health concerns, visual impairment can hinder a child's ability to read facial expressions and learn to predict people's behaviors, contributing to increased social isolation. Children with low vision should be given the tools to learn how to advocate for themselves to further promote their independence and overcome future obstacles that they are likely to encounter during a lifetime with low vision [20,21].

### Clinical objectives for low vision care

Identifying patients with low vision and quantifying their visual loss is the first step. The functional implications or impact of vision loss on reading, activities of daily living, patient safety, continued participation in activities despite vision loss, and psychosocial well-being are to be checked. Evaluation of the potential to use remaining vision or sight substitutes can be known from history

and type of onset of vision loss. Low vision practitioners must educate patients about vision loss, the potential benefits of rehabilitation, and rehabilitation options, including devices, if needed, to engage patients in the rehabilitation process. This includes optimize patients' ability to read, complete activities of daily living and safely participate in activities in the home and community. The psychological adjustment to vision loss needs to be managed by recognizing emotions expressed by the patient and acknowledging the relationship of the emotion to the vision loss (empathetic response), providing information to patients about community and national resources and social supports, involving family and support persons in the rehabilitation process and provide education [6].

Optical devices, non-optical devices, and other assistive equipment can all be used to control low vision. Magnifiers, minifiers, telescopes, and eyeglasses are examples of optical devices for near and far. Non-optical devices operate on a number of different principles and make use of senses other than sight, including as touch, scent, huge print, and glare reduction. Electronic magnifying glasses and rehabilitative services are further helpful technologies.

The age and kind of vision loss should be taken into account when providing low vision aids or recommending children for rehabilitation.

### Pediatric low vision evaluation

The components and order of the pediatric low vision exam vary depending upon the age of the child and their ability to participate. The aim of a low vision examination is to identify the cause of the low vision. Asking time to obtain a thorough history regarding onset, severity, and progression of low vision symptoms is critical. If the child is old enough, it is important to involve them as much as possible to encourage self-advocacy from an early age.

Visual acuity should always be measured with the child's age, school performance, and cognitive ability in mind. Gold standard low vision acuity testing requires near and distance logMAR testing using age-appropriate optotypes [17-19]. Cycloplegic refraction, while included in any pediatric eye exam, even minor refractive correction can lead to improved quality of vision and visual functioning. Dynamic retinoscopy prior to cycloplegia can

be used to evaluate the child's accommodative capacity, which if impaired, may prompt the addition of bifocal correction to aid with near work at school and leisure activities. Visual field assessment in young children can be difficult but important for understanding the impact of low vision on a child's mobility and visuospatial orientation. Results of contrast sensitivity testing may provide insight into a discrepancy between a child's formal visual acuity testing and their day-to-day visual functioning. Decreased contrast sensitivity may correlate with poor visual functioning despite relatively intact visual acuity. Validated color vision tests for children with reduced visual acuity include the Farnsworth D-15 test or the abbreviated Mollon-Reffin minimalist (MRM) test [17-19].

### Low vision aid according to life stage

School-going children usually need optical devices for distance and near along with non-optical devices like large print books. Teenagers are an excellent candidate for optical devices but they may not use them due to cosmetic issues. For those needing higher levels of magnification, electronic magnification devices work the best. Teenagers can be advised to use electronic devices specifically screen readers and magnifiers which may be helpful in vocational training as well [9,10].

Another important aspect to be taken care of is the regular screening of children in schools for the blind that could identify children who might benefit from LVD. Many patients will benefit from referral to or information about community resources, including services for seniors or individuals with disabilities, transportation alternatives, radio or telephone reading services for newspapers and magazines, free dialing services from telephone companies, shopping assistance, services available from state agencies for the visually impaired, and national services, including the Library of Congress Talking Books Program available to anyone unable to read standard print [6]. A review of protocols for the entry of children in schools for the blind by screening these children by a specialist team prior to admission should be made mandatory [11].

### Low vision aid according to vision loss

Vision loss can be classified into three categories and types of low vision aid will be according to it due to different functional implications. In peripheral field loss, there will be inability to identify objects (sides), there can be low light and dark adaptations,

and poor vision in dull light. To manage peripheral field loss, field expanders in form of lenses or prisms can be used. In the case of the central field, loss symptoms can be Poor perception of people and objects, Poor color discrimination, Poor perception of distance and near objects. For managing central field loss, magnification or eccentric viewing can be done. There will be poor vision and clarity affected by reduced contrast and increased sensitivity to light. Poor night vision due to overall blurred vision. To manage overall blurred vision, low vision aid using magnification is given [1-6].

### Rehabilitation

Although patients with acquired or progressive central nervous system disorders, such as those caused by trauma, stroke, neurodegenerative diseases, and tumours, frequently have significant limitations as a result of visual impairment, they may be disregarded in the referral process for vision rehabilitation. Referring such individuals is recommended since the vision rehabilitation specialist can be very helpful to them. All patients who could gain from vision rehabilitation don't always have access to therapies [6].

Lack of referrals or awareness of services, ignorance of what services may offer; ignorance of advantages available from services, lack of transportation to services, and lack of financial means to acquire equipment are all examples of access obstacles to services for vision rehabilitation. An essential component of vision rehabilitation is assistive technology. The effectiveness of rehabilitation is influenced by several variables. Rehabilitation may seem like a huge letdown to patients who are hoping for a cure for their condition and a return of their vision to "the way it was," which may be a challenging challenge for the therapist. Goals and expectations may be impacted by cultural influences. Some patients don't have enough money to buy assistance [6].

Although the Center for Medicare and Medicaid Services covers rehabilitative services, gadgets are not presently covered. Many patients have additional physical conditions that affect their recovery or make them more dependent. Specialized adjustments may be necessary for patients who have hearing or mobility issues so they can utilise optical equipment and some compensating techniques. Patients with low stamina and low energy may move through the rehabilitation procedure more slowly. It's crucial to understand that, despite the difficulties these circumstances

provide for professionals working in vision rehabilitation, some services may still be delivered to patients. Homes of patients with cognitive impairments can be made safer, and their carers can be taught how to accommodate these patients' eyesight loss. There is therefore no justification for denying vision rehabilitation to a patient who has lost their eyesight [6].

### Conclusion

Children with low vision must be managed by keeping in mind the type of vision loss and adaptation to it. Both the training to use potential vision along with rehabilitation services should be provided so that child's education is not hampered.

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