



This article focuses on the assessment of a child or young person with vision impairment (VI), looking specifically at history taking and clinical and functional testing of vision. The optometrist's role, as a primary or secondary healthcare professional in providing the low vision assessment, is critical to the process. This article aims to arm the reader with the key concepts and ideas needed to enable them to assess children with VI within the scope of their practice.

A low vision service is a rehabilitative or habilitative process which provides a range of services for people with low vision to enable them to make best use of their eyesight and visual function to achieve maximum potential.¹ Hence the low vision assessment is one part of the pathway. In Part 4 we will consider some of the other professionals involved in the pathway.

Referral

Children, young people and their families can be referred for a low vision assessment by a number of professionals. These include an ophthalmologist, orthoptist, paediatrician, GP or an education professional. It is important to establish the source of the referral to ensure that all those involved in supporting a child or young person with VI communicate their findings in a child-centred approach. It is most usual that the age at which a child is referred for a low vision assessment is on entry to school at age 4-5, but some advocate seeing children at pre-school age.² Rather than being prescriptive about the age it is better is to judge each child, young person and their family on their individual circumstances.

History taking

As for an eye examination, history taking is one of the most important parts of the low vision assessment. It is important that sufficient time is allocated to this part of the routine and it is not unusual, the first time that a practitioner sees a child or young person and family, to spend 20 minutes taking a full history. The practitioner must question proactively and understand that as they develop a rapport with the child or young person and family they will glean a greater understanding of the child's difficulties. The low vision assessment, in many cases, is just the start of a relationship between child or young person and practitioner that can last many years. It is therefore invaluable to ensure that the same practitioner sees the child or

Paediatric low vision

Part 2 - The assessment

In the second of our four-part series, **Rasmeet Chadha** and **Dr Gillian Rudduck** describe the best way to assess the eyes and eyesight of a child with a visual impairment. **Module C16863**, one general CET point for optometrists and dispensing opticians

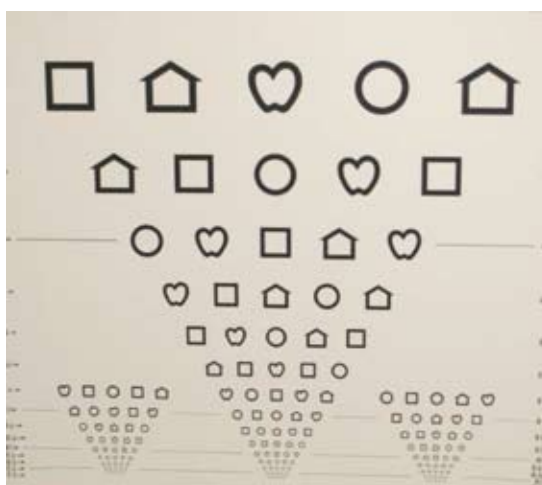


Figure 1a LogMAR Lea symbols chart



Figure 1b Maclure near vision chart opened at the page for reading ability age 5-6

young person and their family for the follow-up appointments. It is important to include the child, whatever their age, as the assessment is principally about their needs. Including them also facilitates the process whereby they grow up to understand and articulate their own needs and empowers them to begin to take responsibility for this.

A pre-clinical questionnaire can be very useful. This can be sent to the parents ahead of the appointment so that they can take the time to gather any information that will facilitate the assessment. The questionnaire can cover areas such as:

- What is the diagnosis/condition causing your child's VI?
- Is your child registered as having a VI?
- Does your child have a statement of special educational needs (SEN)?
- Which professionals support your child with respect to their VI?
- What sort of difficulties does your child have with their vision?

Understanding of condition and the role of the low vision assessment

It is important at the outset to gain an understanding of how much the parent

and child or young person understands about the eye condition, its effect on visual functioning and its prognosis. VI Scotland³ and RNIB⁴ produce valuable patient information leaflets on major eye conditions which can be used by the practitioner to help the child or young person and parent to understand the eye condition.

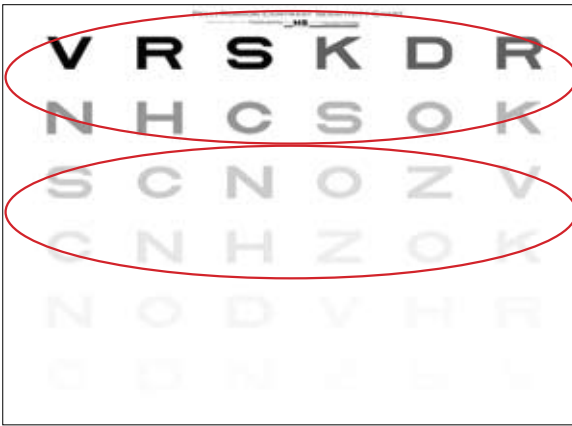
The practitioner should ensure that the child or young person and parents fully understand their role within the low vision assessment and possible outcomes as it helps to manage expectations.

History and symptoms

The practitioner must cover a number of key areas during history taking and it is up to the practitioner to ask the right questions but not in a way that the child may feel interrogated. Examples of areas to be explored in history and symptoms are given below:

Symptoms

The child, young person or parent may not specifically be able to answer an open question such as 'what are the symptoms?' Instead the practitioner may need to ask more closed and



90-31 per cent
Severe loss. Consider
non-sighted aids

22-7.8 per cent
Significant loss.
Requires contrast
enhancement

**Figure 2a Pelli
Robson contrast
thresholds**



Figure 2b Hiding Heidi contrast test

specific questions to try to build up a picture of the effect of the impairment. Examples of questions are:

- Are there any problems with distance vision, near vision, glare, night vision or colour vision?
- How does lighting and glare affect the child or young person's function?

Be aware that a positive response to asthenopia or headaches (even in the absence of any reported visual difficulties) may suggest that the child or young person is struggling with the visual demands placed upon them and may be the practitioner's only clue to the difficulties they experience. This may be because the child (particularly if a teenager) is reluctant to discuss their difficulties for fear of being given spectacles or optical aids that will make them look different or simply because the child, not knowing any different, has not appreciated the difficulties that their VI has placed upon their visual functioning.

It is important to understand the child or young person's visual needs in the context of their general health and other potential needs. It is estimated that high percentages (over 70 per cent in some studies) of children with VI have additional non-ophthalmic disabilities and disorders.⁵

Use of spectacles and devices

It is important to establish whether spectacles and/or optical low vision aids have been prescribed and whether they are used (being prescribed and being used are two very different things!). Also, whether any form of glare management is being employed such as sunglasses or peaked caps?

School

What sort of school does the child attend? Does the child have a statement of SEN? Is the child supported by a qualified teacher of the visually impaired (QTVI)? What sort of additional support does the child receive at school?

With the drive towards inclusivity⁶ it is important to consider their VI in the context of other normally sighted children. Nearly 75 per cent of children with VI in England aged 5-10 years and nearly 66 per cent aged 11-16 are educated in the mainstream setting,⁷ and despite appropriate modifications and allowances within their learning environment it takes much more to achieve the same as a normally sighted child.

Home

Establish whether other family members have a similar VI (such as in some genetic eye conditions), how the VI has affected family and friend relationships and the emotional wellbeing of the child or young person and parents? Also find out whether any modifications to the home environment have been made or need to be made? Has the parent applied for any appropriate benefits such as Disability Living Allowance (DLA).

Near tasks

A lot of time needs to be taken exploring this area, as being able to access material at near is very important both at school and at home. A detailed picture of the exact nature of any near task or target is essential.

Mobility

Can the child orientate and navigate well? Does the child have the level of independence that would be expected for their age?

Assessment of visual function

Visual acuity

The test chosen must be appropriate to the child or young person's age and cognitive ability. As the child will probably be school age when they attend, it is more than likely that the practitioner will be using a letter matching test. LogMAR tests are the

gold standard in low vision work and there are a number of distance and near LogMAR tests available. The distance visual acuity (DVA) measured must be interpreted in the context of the difficulty that the child or young person may have. For example, a child with DVA of 0.500 (6/19) may have difficulty accessing the whiteboard at school. This task would be made significantly easier if the child was re-positioned to be at the front of the classroom.

Near vision assessment is probably one of the most important parts of the low vision assessment. This is because vision 'up close' is where most of the child's day to day activities are focused (reading, writing, computer, eating, seeing faces of family and friends). Children with VI often hold reading material very close so as to benefit from relative distance magnification (objects appear twice as big if held twice as close). Therefore it is important to measure the child's near vision at their preferred reading distance and record this clearly in the notes. It is important too to establish if any difficulty reading is due to VI or the child's ability to read. The Maclure test chart is very useful from this point of view. It has a series of pages that provide text of varying sizes that are specific to a given age. Hence it can assist the practitioner in establishing whether poor reading ability is because of the VI or the child's reading ability.

Contrast sensitivity

There are some child-specific contrast sensitivity charts (eg the Hiding Heidi chart) as well as the standard charts used in adult low vision work. The Hiding Heidi set has four cards with contrast levels of 1.25 per cent, 2.5 per cent, 5 per cent, 10 per cent, 25 per cent and 100 per cent and a blank card. The practitioner places the blank card over a 'Heidi' face and simultaneously moves each card out to



the sides, using a 'preferential looking' technique. Findings of reduced contrast sensitivity are very important as they may help explain the differences between measured visual acuity and visual functioning in the real world. Figure 2a demonstrates the likely effect on visual functioning of given Pelli Robson contrast thresholds

Visual fields

Measurement of the visual field can be difficult in very young children but is very important as it affects orientation and mobility, as well as registration status. The optimal position of the child in the classroom may also be determined by the presence or absence of a field defect. For example, a child with a right homonymous hemianopia should be positioned to the right-hand side of the classroom so that all activities that occur in the classroom occur in the child's seeing field. With younger children the practitioner may need to perform a modified version of confrontation fields in which they note the point at which the child looks towards the target in the periphery as an indication of when it is first seen. For the older child (age six upwards), Goldmann fields are invaluable (as they easily assess peripheral fields and the speed of the test can be modified to suit the patient) but not readily available. Static field tests can provide useful information in older children, particularly in instances of macular pathology, but care must be taken to minimise false positive and negative responses.

Colour vision

Assessment of colour vision is important for interpretation of difficulties anticipated at school and at home. It is important to consider not only acquired forms of colour vision deficiency associated with the pathology in hand,

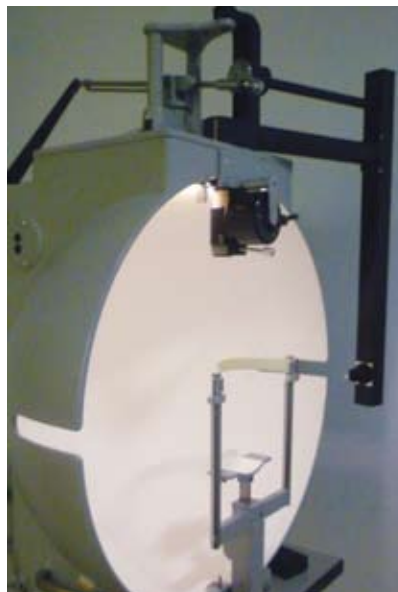


Figure 3 Goldmann visual field test

but also congenital colour vision loss which affects 8 per cent of males and 0.5 per cent of females. Children with colour vision loss may have difficulty with science experiments and map work in geography or art. If the colour vision deficiency is acquired it is important to reassess it as the condition progresses. The Ishihara test is used to identify red/green colour vision deficiency. Other tests of value in the paediatric population are the D-15 and the new HRR (Hardy-Rand-Rittler) tests.

Refraction and accommodative function

Accurate refraction and appropriate prescribing are crucial in the context of paediatric low vision work to ensure the child or young person is given the opportunity for the best visual functioning. It is known that children with VI have a higher incidence of refractive error. Retinoscopy (and arguably cycloplegic retinoscopy) should form the first stage of a

refraction as it can provide information that may be missed if just a subjective refraction is undertaken (for example latent hyperopia and the presence of lens opacities). Refraction can be difficult in the instance of nystagmus or cataract and the practitioner may need to modify their testing procedures in the same way that they would for adults.

As children with VI often use relative distance magnification to read and therefore exert high levels of accommodation, it is important to assess their accommodative function and reduce any symptoms of asthenopia by prescribing even small degrees of hypermetropic error. Dynamic retinoscopy is a good way to assess accommodative function as it is an objective test that is quick to do. Some recent research⁸ suggests that hyperopes show a greater accommodative lag compared to non-hyperopes and so consideration as to accommodative function and its affect on visual functioning for a given individual is crucial to ensure that the optimal refractive correction is prescribed.

Functional vision and quality of life

It is important to understand the difference between clinical tests of visual function (which have been described above) and functional vision.

Functional vision assessments establish how children make use of their sight. They are normally done in school or at home instead of in a clinical setting. Functional vision assessments usually involve a QTVI.

All children are different and two children with the same visual acuity may use their vision in very different ways. It is not always possible to know how much a child sees from clinical

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measures, so a functional assessment can help to ensure that a child makes the most of whatever sight they have.

By observing the child as they go about their daily routine one can customise modifications to meet their personal needs as well as determine the correct level and type of support to optimise learning and access.

Environmental conditions, self-consciousness, fatigue and curriculum demands can all affect the way a child uses their limited vision.

Quality of life has been defined by the World Health Organization as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.⁵ Hence it relates more to their functional vision than their clinical vision. While visual rehabilitation aims to improve quality of life, it is known that children with VI continue to have a reduced quality of life.^{9,10} Practitioners and professionals working with children with VI must remain mindful of this in the context that most children with VI are educated in the mainstream setting alongside normally sighted peers.

Part 3 in the series will look at the next stage of the assessment process: prescribing optical and non-optical aids for children and young people with VI as well as the further management that must be considered. ●

References

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MULTIPLE-CHOICE QUESTIONS - take part at opticianonline.net

1 What estimated proportion of 5-10 year-olds assessed as having a VI are educated within the mainstream education system?

- A None
- B 25 per cent
- C 50 per cent
- D 75 per cent

2 With which of the following corrected distance logMAR acuities might a child be expected to have difficulties viewing a whiteboard in the school classroom?

- A -0.1
- B 0.0
- C 0.1
- D 1.0

3 Which of the following contrast levels are not assessed with Hiding Heidi?

- A 2.5 per cent
- B 5 per cent
- C 20 per cent
- D 25 per cent

4 For an eight-year-old child, which of the following is best to assess their peripheral visual field?

- A Gross perimetry
- B Goldmann visual field screener
- C FDT
- D Confrontation

5 When a VI child holds a book closely, they are exploiting which of the following?

- A Angular magnification
- B Relative distance magnification
- C Relative size magnification
- D None of the above

6 Which near acuity targets ensure that the font and contents are appropriate for the age of the child?

- A Maclure test chart
- B N value near fonts
- C Jaeger test charts
- D Sheridan-Gardiner test

Successful participation in this module counts as one credit towards the GOC CET scheme administered by Vantage and one towards the Association of Optometrists Ireland's scheme. **The deadline for responses is August 11 2011**



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