

## VISUAL PERFORMANCE IN THE LOW VISION CHILD

**CHRIS RUBIE** AssocDipOrth (Cumb), DOBA  
Child and Adolescent Services Department, Royal Blind Society of N.S.W.

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### Abstract

*The visual performance of pre-school children who have been assessed in the Child and Adolescent Services Department of the Royal Blind Society of N.S.W. is discussed.*

*The developing low vision child often establishes strategies around his visual impairment to compensate for his visual loss. The importance of clinical observation, and of spending time with these children, indoors and outdoors, is discussed. In addition to this, emphasis is placed on obtaining information from the parents, who can provide details concerning the child's visual performance in the home and a history of any deterioration or improvement in his vision.*

**Key words:** *Visual impairment, strategies, clinical observation, visual functioning, residual vision, parent observation.*

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### INTRODUCTION

While much emphasis is placed on obtaining a visual acuity recording of the pre-school child in an orthoptic assessment, straightforward clinical observations and a discussion with the parents of the child can be easily forgotten. This, of course, involves a great deal of time which is not usually available in the busy ophthalmological practice or hospital eye clinic.

At the Child and Adolescent Services Department (C.A.S.D.) of the Royal Blind Society, this time is available which proves to be invaluable when attempting to fully understand a child's visual function. Experience in knowing what to look for and a keen eye for a child's every move is essential.

The aim of this paper is to briefly outline the various methods and situations used in the C.A.S.D. when gathering information regarding a child's visual performance in general, with special attention to some of the many strategies employed by the children to compensate for their visual loss.

### POPULATION

A vast range of children with varying degrees of visual impairment and delayed development are seen in the C.A.S.D. For the purpose of this study, children whose cognitive functioning was in the range normal to mild intellectual ability were considered. The various eye conditions represented can be seen in Table 1.

### UNDERSTANDING THE CHILD'S DEVELOPMENT

Before observing the visual performance of children with low vision, it is important to fully understand the nature of their eye condition and any other disabilities they may have. As 45% of children seen at the C.A.S.D. do have other disorders that may affect their development, it is important to have a comprehensive medical history of the child and the family situation to help determine possible reasons for any developmental delay that may be present.

In the C.A.S.D. this information is obtained by case discussions with professionals working

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*Reprint request:* Child and Adolescent Services Department, Royal Blind Society of New South Wales, 4 Mitchell Street, Enfield, New South Wales 2136.

TABLE 1  
Patterns of Referral to the C.A.S.D.  
April 1st 1979 — March 31st 1985

Total No. 595	Incidence	%
Cortical Blindness	91	15.3
Optic Nerve Atrophy	76	12.8
Congenital Cataract (except Rubella)	55	9.2
Retrolental Fibroplasia	48	8.1
Albinism	45	7.6
Congenital Nystagmus	44	7.4
Genetical Retinal Dystrophy	34	5.7
Optic Nerve Hypoplasia	27	4.5
Leber's Tapeto Retinal Degeneration	16	2.7
Coloboma of Retina/Choroid	16	2.7
Congenital High Myopia	14	2.4
Congenital Glaucoma	14	2.4
Aniridia	11	1.8
Bilateral Retinoblastoma	8	1.3
Rod Monochromatism	8	1.3
Microphthalmus	8	1.3
Retinitis Pigmentosa	7	1.2
Optic Nerve Dysplasia	7	1.2
Optic Nerve Glioma	6	1.0
Septo-Optic Dysplasia	6	1.0
Miscellaneous	54	9.1

with the children (including occupational therapists and pre-school teachers) and other members of the assessment team (which includes an ophthalmologist, neuro-psychologist and a physiotherapist).

Those working with the children, to stimulate vision and development, can provide the orthoptist with valuable information regarding how the child utilizes his residual vision in the home and at pre-school.

Up to date ophthalmological reports concerning the ocular diagnosis are also essential to have.

#### TESTING ENVIRONMENT

It is extremely important to allow children to be fully relaxed when assessing their visual functioning.

The layout of the indoor assessment area of the C.A.S.D. is similar to a lounge/rumpus room in the average Australian home. It consists of a beige coloured carpeted floor, to provide a good contrasting background, and many toys, including a cubby house and rocking horse, which help to stimulate and maintain the child's interest. Similarly, in the outdoor assessment area, there is much play equipment, including

tricycles, a small trampoline and a sandpit complete with buckets and spades.

An outdoor assessment area is vital when assessing low vision children as there can be a marked difference in their visual behaviour when the boundaries of the environment are harder to realize. Children affected by glare, such as those with albinism, rod monochromatism and cataracts, can be "blinded" outdoors and yet function visually once they are inside. It must be pointed out that glare is often worse for the low vision child on a light overcast day than on a fine sunny day.

Indoor lighting should also be considered in all vision testing. Dimmer switches for internally illuminated charts and general ceiling lights enable vision to be tested under many different lighting conditions.

To achieve optimum results children also need to feel at ease with the examiner. At least 10 minutes are allowed for the child to develop confidence in the orthoptist.

As many children may have experienced many visits to a hospital the orthoptist is careful about using a clinical torch in this period.

#### ASSESSMENT OF VISUAL PERFORMANCE

##### (1) Standardised Tests

When assessing pre-verbal children, the familiar Stycar series of toys and balls and 100's and 1000's are used. These, however, are often modified according to the degree of visual impairment present and/or the child's level of interest. For example, some Stycar balls have been painted various colours to vary the contrast against the assessment area's beige carpeted floor or conversely, the white balls are rolled across the floor without the black felt to assess the child's visual discrimination of low contrast objects within a room. Care is taken when setting the balls in motion by "flicking" them rather than moving a hand or arm which gives the child clues as to which direction the ball is travelling. The standard visual acuity notations are not used as it is the opinion of the author that they are inaccurate. For example, when the test was administered on a six year old normally developing co-operative child who had Leber's

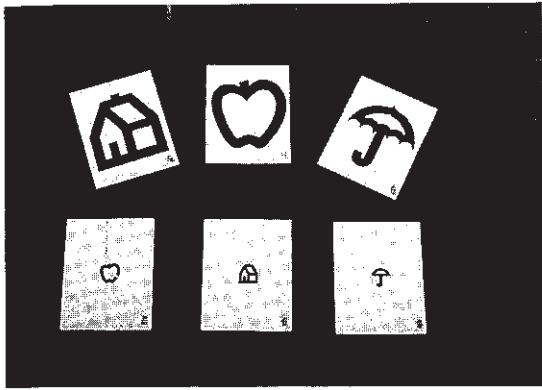


Figure 1: Examples of Lighthouse Symbols.

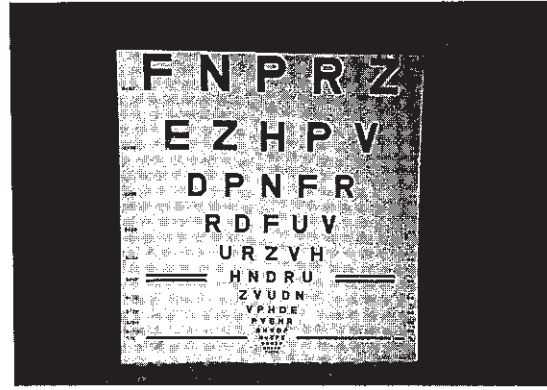


Figure 3: Logmar Linear Chart.

optic atrophy and a binocular visual acuity of 3/60 (as measured on a Logmar Linear Chart), it was found that she could accurately locate a 6/5 (9 mm) ball from a distance of three metres.

Once a child begins to develop some speech or can match symbols and letters it becomes possible to employ more of a range of tests and, thereby, begin to obtain the much sought after visual acuity recording.

Sheridan Gardiner Single Letters are used extensively and modified at times by alternating the testing distance and the number of letters on the child's card. Sometimes the letters are referred to as various objects depending on the child's language ability. For example, the 6/60 letter "O" is often referred to as a "ball".

Other tests used that are not often seen in the regular eye clinic include Lighthouse symbols

(Figure 1) for distance acuity testing and Bust symbols for near acuity testing.

Bust (see Figure 2) is the name of a new test for children at early mental ages and is a combined test of form perception and visual acuity. It was devised by Eva Lindstedt, Ophthalmologist, Sweden, and is designed in such a way that the demands on the child's understanding of the image and also the demands made on his visual acuity can be varied. The test can be used as a card game, played with in various ways and finally used directly for testing visual acuity.<sup>1</sup> Each card is designed in such a way that the person leading the game can see from the back of them which series each card belongs to and the size of its symbol. The pictures come in nine sizes with the largest of them equivalent to N144 and the smallest to N8-10.<sup>2</sup>

When a child has mastered the art of matching, or knows the letters of the alphabet, a Logmar Linear Chart is used. (Figure 3)

This chart is much more comprehensive than the Snellens Chart in that it gradually reduces the letters by the addition of a 6/48, 6/38, 6/30, 6/19 and 6/15 line, with each line consisting of five letters.



Figure 2: Examples of Bust Symbols.

### (2) Clinical Observations

Simple observations of a child's spontaneous behaviour can provide an examiner with a wealth of information about a child's level of vision. When we look at the practical purpose of vision

testing we find that perhaps it is not always so very important to quantify the child's visual acuity. Explanation of a child's visual impairment, in the context of daily activities, is often more meaningful to a parent or teacher than an interpretation of visual acuity notations.

#### *(a) Near Tasks*

Low vision children often hold objects very close to their eyes and adopt an abnormal head posture to reduce their nystagmus. The latter can sometimes be misleading when determining which is the better seeing eye. For example, a child who is adopting a face turn to the left may appear to be favouring his right eye when in actual fact he is viewing with his left eye which is in the adducted null point position for his nystagmus.

Stycar balls and toys or anything held in front of a child for him to reach for are placed on a thin black rod as well as held in the orthoptist's hand to compare each response. When the child reaches for the object, the way in which he directs his hand towards it is noted. Such questions as the following are considered.

Does he under or overshoot? Does he grasp the orthoptist's hand first, then feel his way up to the object? or is his reaching out poorly directed? Once having grasped the object it is also interesting to note how the child handles it. Is he inspecting the object visually, with his tactile sense, or with both?

There are some children, particularly in their first two years of life, whose vision improves from light perception to that of reaching out on sight and spotting objects within a 2-3 metre range. This has been observed in conditions such as cortical blindness and optic nerve hypoplasia. The improvement in the visual system can occur within a matter of weeks but the child's ability to exercise his newfound vision effectively can take longer. Blind mannerisms such as utilization of tactile and auditory senses, or the child simply not looking at the task at hand, are often retained for some time.

#### *(b) Distance Spotting*

When encouraging a child to use his vision to find a particular object care is taken to avoid any

auditory cues or familiarity as to where it is or should be. Any object can be used when assessing distance vision as long as its size, description and distance it was spotted at, are accurately recorded. Although some children may only respond to well known objects, e.g. a dummy or a bottle, this can be an advantage as it becomes more meaningful to the parent when explained in terms familiar to them.

When a child is encouraged to retrieve an object, the way he approaches the task is closely observed. Such questions as the following are considered:

Is he effectively scanning his environment to find the object?

Has he spotted it before venturing out to retrieve it? or does he move forward in the hope of seeing the object when it comes into his range of vision?

The child is encouraged to point to the object before retrieving it, which gives a truer indication as to whether or not he has seen it. If he will not point, he is closely watched as he moves forward to see if he "alters his course" as he approaches the object. Often he will break into a run or a quick trot and get excited when he has spotted it.

#### *(c) Recognising People's Faces*

A simple test has been devised in the C.A.S.D. to help determine the exact distance a child needs to be from people before being able to recognise their faces. Three participants, including one parent, are used and seated within a chair space of each other in the corner of the assessment room while the child is in another room. The participants are carefully selected, so that hair colouring and general outline are similar, and are instructed to wear thin lemon over-coats to obscure any item of clothing that may be a clue for the child. Each participant remains silent and does not make any hand gestures or facial expressions.

The child is encouraged to "find daddy or mummy" by having him give something to his parent or get something from them. After he has become familiar with where the parent is seated the test is repeated with the participants exchanging places.

It is often quite striking to the parents how close their child needs to be before being able to recognise their face. The test highlights his reliance on other clues such as colour, contrast and memory.

This test has been titled the "Kimino" test.

#### *(d) Hand Gesture and Facial Expressions*

Communication between one another does not only occur through speech but can be just as effective through body language. As Scott et al. point out, in any family, there is a tremendous amount of nonverbal communication going on all the time.<sup>3</sup> By a smile, a frown, or a tender look a clear message can be sent across the room. A wave of the hand, a pointing of the finger and shaking or nodding a head all convey messages. As a visually impaired child can often miss or misunderstand these gestures, the distance at which they can see these non-verbal clues needs to be ascertained.

In view of this, gross and fine hand gestures, e.g. hands on head and pointing to facial features respectively, and various facial expressions are performed by the orthoptist at various distances. Eye contact is also noted during this test.

Gross hand gestures can usually be seen by children with 3/60 vision or better at six metres but fine hand gestures with children whose visual acuity is between 3/60 and 6/24, are often confused at this distance.

This information is not only valuable to the parent, but also the teacher, as it helps to correctly position the child in the classroom.

#### *(e) Orientation and Mobility*

Observation of the low vision child moving around his environment, indoors and outdoors, can not only provide the orthoptist with information about the degree of visual impairment present and whether any residual vision is used in an effective manner, but can also give a general idea of any gross field defects present.

The orthoptist pays particular attention to how the child approaches unfamiliar territory and how he scans his environment. The latter can be assessed by encouraging him to walk or run through an obstacle course.

A common feature seen during assessments in the C.A.S.D. is the child hesitating or putting his foot forward to feel any changes in contrast of the terrain, before negotiating it. Some children move across the change with a high stepping action or bend down to crawl over it, thinking the new surface is at a different level.

A similar action can be seen when the child passes over shadows or cracks in the pavement.

The orthoptist also notes if the child walks with slightly outstretched hands or with a tentative gait. Some children consistently lead with one foot, walking slightly sideways and adopting an abnormal head posture to centralise their field of vision.

As previously mentioned, glare can have an adverse affect on visual functioning. Mobility can be grossly affected, particularly outdoors, in that the child becomes cautious in his surroundings and relies on his other senses more.

#### *(c) Parents' Observations*

The parents are often the best assessors of their child's visual functioning as they are with him in many different situations and know his every mood. More often than not an orthoptist or ophthalmologist is only confirming what the parents already know, as far as the child's visual capabilities are concerned.

During an assessment at the C.A.S.D. a good half an hour or more is spent with the parents to gather information about the child's visual functioning in the home or places he is likely to visit. The following are a few examples of questions that are asked:—

1. How close to the television does he sit?
2. At what distance does he hold objects to inspect them?
3. What does he indicate he can see while travelling in a car, e.g. can he spot animals in nearby paddocks?
4. Can he see the moon or stars at night?
5. Does he see better during the day, at dusk or at night?
6. Does he become "clingy" in unfamiliar environments?

Answers to these questions help to form a profile of the child's visual capabilities for

practical purposes. When documented, this helps the lay person to fully understand the needs of the visually impaired child.

The parent can also provide a detailed history of any changes in the vision. The child may become more adept at utilizing his residual vision or may actually become more visual due to such things as the maturation of his visual system, cataracts being removed or appropriate spectacles being prescribed. Conversely he may begin to stumble over things, hold objects close to his eyes or become more irritable or frustrated as his vision deteriorates. Usually the parents can give the most accurate information concerning these observations.

#### CONCLUSION

Through experience in clinical observation the orthoptist can become more adept at placing a child's visual functioning in the following categories of visual acuity.

Light perception	→	1/60
1/60	→	3/60
3/60	→	6/60
6/60	→	6/18
6/18		or better

One must always be on the lookout for any signs of visual impairment as many children may present extremely visually alert and perform very much like a normally sighted child. Pre-school children seen in the C.A.S.D. who have as little vision as 3/60 often have adequate vision for

their present needs. The visual impairment of these children is more obvious when greater demands are placed on their vision at school, e.g. when they commence reading or blackboard work.

In summary, clinical and parental observations of the low vision child's visual functioning, a good understanding of his physical and psychological development, and time with the child are all important factors when making recommendations to parents. The orthoptist can play a key role in the assessment of the low vision child by bringing the parents, and other professionals involved, to a fuller understanding of the child's present condition and its implications in the present environment and the future.

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